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Municipal Acquirement
— OF —
Private Water Company Plants
AS ILLUSTRATED BY THE
Syracuse Water Works Company's
CONDEMNATION

BY THE
City of Syracuse, N. Y.

A PAPER

Read before the American Water Works Association at Milwaukee, Wis.. Sept. 6th, 1893, by

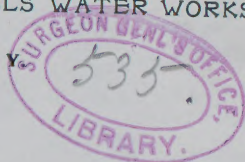
STEPHEN E. BABCOCK,

Consulting Engineer, Little Falls, N. Y.

MEMBER OF THE AMERICAN WATER WORKS ASSOCIATION.

CHIEF ENGINEER LITTLE FALLS WATER WORKS,

LITTLE FALLS, N. Y.



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Municipal Reformatory

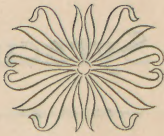
Private Water Company Plans

AS PREPARED BY THE

Engine Works Company's

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BY THE



City of New York

A PAPER

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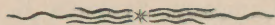
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*Municipal Acquirement of Private Water
Company Plants, as Illustrated by the
Syracuse, N. Y., Water Company.*



CONDEMNATION BY THE CITY.



Gentlemen of the American Water Works Association :

Having taken part in presenting the engineering testimony in the Syracuse Water Company Plant Condemnation, I have thought it might perhaps interest the members of this association and be profitable to know upon just what lines of evidence this important case was tried.

Under and by a Special Act of the Legislature of the State of New York, the city of Syracuse was authorized to acquire, either by purchase or condemnation proceedings, the entire property, rights and franchises of the Syracuse Water Company. The city authorities and the Water Company not being able to agree upon a purchase price, resort was had to condemnation proceedings, which proceedings began April 7, and terminated September 9, 1891.

Under an order of a Judge of the Supreme Court of the State of New York, three Commissioners were appointed Referees to hear the evidence and make an award in the case, subject however to confirmation by the Supreme Court, and carrying with it the right of appeal by either party of the Court of last resort in the State, i. e. the Court of Appeals.

The Commission was organized by the appointment of Judge Kernan, of Utica, George W. Dunn, of Binghamton, and Cornelius J. Ryan, contractor, of New York, now of Baltimore, Commissioners.

APPEARANCES OF ATTORNEYS.

For the City, P. B. McLENNAN, C. L. STONE.

For the Water Company, MARTIN A. KNAPP, WILLIAM S. ANDREWS.

While the engineering experts in the case were :

For the Water Company, STEPHEN E. BABCOCK, Chief Expert, Civil and Hydraulic Engineer, Little Falls, N. Y. ; PETER MILNĚ, Civil Engineer, Brooklyn ; R. W. SHERMAN, Civil Engineer and Contractor, of Utica, N. Y.

While for the City the Engineers who appeared in the case were :

J. NELSON TUBBS, Chief Expert, Civil Engineer, of Rochester, N. Y. ; HOWARD SOULE, Consulting Engineer for the City Water Board, Syracuse ; W. R. HILL, Constructing Engineer new works, Syracuse, N. Y. ; DEXTER BRACKETT, Civil Engineer, Boston ; M. M. TIDD, Civil Engineer, Boston ; LEWIS H. KNAPP, Superintendent Water Works, Buffalo.

The plant of the Syracuse Water Company consisted of about forty miles of water mains, subdivided into the following sizes and lengths: cast iron pipe, 3,595 feet 30 inch pipe ; 10,510 feet 24 inch ; 1,915 feet 16 inch ; 20,665 feet 12 inch ; 7,580 feet 10 inch ; 15,756 feet 8 inch ; 54,231 feet 6 inch ; 53,881 feet 4 inch.

While of cement lined pipe there was : 10,350 feet of 10 inch ; 13,395 feet of 8 inch ; 13,810 feet 6 inch ; 18,603 feet of 4 inch.

And as to the length of mains there was no dispute.

There was one 10,000,000 gallon Worthington pump and two 3,000,000 gallon Deane pumps with four 100 H. P. boilers, with the necessary pump station house and appendages; an 80,000,000 gallon distribution reservoir and two storage reservoirs, one of 6,000,000 and one of 176,000,000 gallons capacity, known by the names of the Distribution, the Crossett and Onondaga Hill reservoirs.

The plant was part pumping and part gravity systems; the gravity supply being, however, only the yield of about two square miles of drainage into the Onondaga Hill reservoir, and a series of springs feeding the Crossett reservoir, the main supply being pumped up from Onondaga Creek to the distribution reservoir. The daily consumption on the 40 miles of pipe was about 7,000,000 gallons. The Onondaga Hill and Crossett reservoirs supply was perhaps 500,000 to 2,000,000 gallons per day due to the season of the year, the balance pumped water. The water company also owned the meters used in connection with the system and all the house connections to the line of the side walk. All the hydrants were owned and maintained by the city and for the service of which the city paid the company about \$27,000 annual hydrant rental. The company owned the right to use the waters of Onondaga Creek, a water shed of about 70 square miles, for water works purposes. There also was an experimental driven well station located in the valley of the Onondaga Creek. Not much value was attached to this experimental plant by either side.

There were also deeds from riparian owners of water rights on a small stream called Harbor brook, but which never was used.

The organization of the Syracuse Water Company was an old one dating back to 1849 and the plant of the company was developed up to the capacity as it existed at time of condemnation from a very small gravity system from the Crossett reservoir and was a matter of gradual growth.

The line of evidence admitted in the trial of the case, and the positions held by the experts on each side in support of the different estimates given, I will now endeavor to give in detail in the order of the various elements making up the plant.

1st. The various title deeds, franchises &c., were put in evidence.

2d. The construction and profit and loss account, in full from the commencement of the work, were put in evidence. The construction account showed that there had been expended on the works a fraction over \$900,000; while the profit and loss account showed that the plant had reached a net income of \$70,000 per annum over and above all charges.

3d. An estimate of the cost of replacing the plant was submitted by the engineering experts on each side and first in the order the cast iron and cement lined pipe was estimated by the experts for the company to be worth \$206,000, while the experts for the city excluded the cement lined pipe entirely as valueless and estimated the cast iron pipe at \$116,943.18, but from this value Mr. Tubbs deducted what he called depreciation in the pipe, assuming its lifetime at 66 years; making deduction of \$49,610.63.

In defence of the company's estimate in the value of the pipe, it having been shown by the evidence of the officers of the company that the cost of maintenance of the cement lined pipe was much less than the cast iron mains, the company experts held that as the cement lined pipe was doing equally as good service as the cast iron its place should for the purposes estimating the replacing of the same be by substitution of cast iron, as cast iron was equally as good, although it could be supplied cheaper today than the cement lined pipe and that for the purposes of estimated value, the cement pipe could not be ignored, but either that or something equally as serviceable must be substituted. Again, on the question of the life time of the pipe under ground, Mr. Tubbs elaborated a new theory that due to probable incrustation, 66 years was the fair useful lifetime of cast iron pipe, showing by Mr. Dexter Brackett that in the Boston Water Works some 6 and 8 inch pipe had nearly entirely stopped up. This being a matter of pure speculation, the company experts decided not to introduce evidence in denial of this proposition, but to cut the Gordian knot by digging up a number of lengths of

pipe that represented the pipe in the system of the various ages as actually laid under ground as well as sections of the cement lined pipe and ascertained their actual condition. Some of the pipe was very old; had been made long before the coating process was brought into use in this country and had been cast, not on end, but on the sides; they also caused sections of each class and age of pipe to be fitted up with ends and submitted to hydraulic pressure in the presence of the court as also the cement lined pipe. The uncoated pipe which had laid under ground about forty years was found to be apparently as perfect as when laid and coated neatly and uniformly with a coating not to exceed 1-64 of an inch at any place while the coated pipe was apparently in as good condition as when laid under ground. Both classes of cast iron pipe stood a hydraulic pressure of 700 pounds to the square inch, while the cement lined pipe was tested successfully up to 300 pounds to the square inch and in sections where the cement was removed the wrought iron core appeared as perfect as when originally laid in 1862 and 1863.

VALVES IN THE SYSTEM.

There was practically no difference in the estimates on valves, Babcock being \$6,968.50, while Tubbs made it \$6,953.50. Mr. Tubbs, however, made a depreciation of \$1,847.75, holding this depreciation on general principles, while the company experts held that the valves could present little or no wear; that they were practically constantly open and only operated in case of breaks, tapping being largely done under pressure of late years and in the cement lined, taps or nipples were inserted in the construction of the works. Next came the item of laying the pipe. The Babcock estimate was \$114,253.15, including estimation of laying cement lined pipe under head of iron pipe; while the Tubbs estimate was \$66,829.53, and did not include anything for the ten miles of cement lined in the system. The two prices were the same for the four-inch pipe, i. e., 25c per foot, but upon the larger sizes of pipe the discrepancy was quite large. There was quite an

amount of rock trench upon the value and amount of which there was a wide chance for variation in opinion. There was quite a large amount of pavement in the various streets and in many of the streets the pipe had been laid long prior to the pavement. The experts for the company held that the company was entitled to compensation for relaying this pavement, although perhaps much of it had not been actually taken up and relaid; they held that as the estimate was the cost of replacing the plant the replacing must be as of to date. That the pavements now existed and must of necessity be taken up and relaid to replace the plant and that the fact of the pavement having been laid subsequent to the pipe laying the city had by so doing imposed an additional burden on the company in the cost of maintenance due to repairs and that therefore this item was a legitimate one in the estimate. After an extended argument by the various counsel in the case, the item was admitted by the court. The two estimates were as follows: Babcock's estimate \$46,872, while the Tubb's estimate came to \$25,886.59.

The three reservoirs were estimated by the company experts at \$262,500, being divided up as followss :

| | | | |
|--------------------------|---|---|---------------|
| Distribution Reservoir, | - | - | \$ 120,000 00 |
| Crossett Reservoir, | - | - | 12,000 00 |
| Onondaga Hill Reservoir, | - | - | 130,500 00 |
| | | | <hr/> |
| | | | \$ 262,500 00 |

While Mr. Tubbs estimated them as follow :

| | | | |
|--------------------------|---|---|---------------|
| Distribution Reservoir, | - | - | \$ 98,139 36 |
| Crossett Reservoir, | - | - | 4,812 93 |
| Onondaga Hill Reservoir, | - | - | 41,967 76 |
| | | | <hr/> |
| | | | \$ 144,920 05 |

This was a very wide discrepancy. The fact was the construction and repair account had all been run in together and there was no practical way to separate the items of cost of reservoirs. Again during the 40 years of the existence of the company the officers had changed many

times; the old plans and data had dissappeared. The Onondaga Hill reservoir was built about 1863 or nearly thirty years ago; the Crossett about forty years, while the distribution reservoir was built about 1872, or over twenty years ago. The engineers who had constructed the Crossett and Onondaga Hill reservoirs were dead and in fact no positive information was attainable. This state of facts existing, the experts for the company decided that it was useless to re-cross-section and re-measure up the work done as no measurements now made would represent in any sense the cost of work or cost of duplication as in all the cases the foundations were bad ones and it had always been understood very expensive to construct. At the suggestion of myself the estimate for the reservoirs was based on a general average of the cost of water works reservoirs at \$1,000 per million gallons capacity, subdividing this sum into \$1,500 per million gallons for the distribution reservoir, \$2,000 per million gallons for the small one and \$750 per million gallons for the large storage reservoir. In rebuttal Elnathan Sweet, Ex-State Engineer of New York State canals, was called to show the cost of State storage reservoirs which were much lower per million gallons, but Mr. Sweet admitted that reservoirs constructed on the lower lands to supply a canal with water were not to be compared with water works reservoirs where sanitary conditions must obtain, and also that the paraphernalia to manipulate a water works reservoir were more elaborate and expensive than simply for a canal reservoir and with the exception of this evidence the estimate went through the case entirely unrebuted and stood unchallenged by any adverse facts.

Mr. Tubbs, however, put a large engineering corps in the field and made up an approximate estimate of cost of construction assuming a depth of foundations under ground of about 7 feet, but which was rebuted by an old assistant on one of the reservoirs who swore down to 29 feet depth under ground instead of 7 feet.

The meters in use were, by Babcock, estimate, \$12,328,

their cost; with \$1,945 for setting, while Mr. Tubbs estimated the meters at \$13,113.50 and setting at \$1,155.97, but Mr. Tubbs made a reduction of \$5,698.93 depreciation in the present value of the meters. The company experts held that if the meters were in a state of repair and good order today no deduction from cost should be made. That the repair account had brought the meters up to a condition of efficiency equal to a new meter; that the working parts were few in number and with little friction in the bearing parts and which parts must be kept up to good order by repair account to insure correct results. In this view they were sustained by Mr. Kelly, President of the National Meter company, while Mr. Folger, of the Thompson Meter company, held with Mr. Tubbs that the lifetime of a meter was approximately twelve years and therefore the present value of the meters should be scaled down.

The company experts did not estimate the driven wells at all, holding them to be of no value except for junk and costing more to remove than their value, while Mr. Tubbs placed a value on them of \$2,901.47. The wells were driven on leased ground, were experimental, the water obtained was about 26 degrees of hardness, so hard as to be practically valueless for water works purposes and the experiment was therefore a failure.

The services were 1850 in number and were estimated by the company experts at \$20 each, making a total of \$37,000, while the Tubbs' estimate was based on varying prices and footed up \$29,963.72.

Mr. Tubbs' gross estimate for the cost of duplication of the plant was \$416,536.17 with the deductions for depreciation of \$42,476.71, being his judgment of the cost of placing the system in good order by substitution of large pipe in place of four and six-inch pipe now existing, making his total net estimate of present value \$326,030.15, exclusive of pumps and house which Babcock estimated at \$100,000, city \$65,000, while the estimate of the engineers for the company for present value of the plant including pumps and house was \$857,775.06, and no allowance was

made for inefficiency by reason of four and six-inch pipe being used largely in the system and in support of their position. I produced statistics of the Rochester water works, Mr. Tubbs' life monument, he having designed and run the same for about nineteen years, showing that while 62 per cent of the Syracuse pipe was under six and four-inch; 70 per cent. of the Rochester system was also under six and four-inch, while Waltham, Mass., called for 81 per cent., Fitchburg, Mass., 76 per cent., Erie, Pa., 90 per cent., Washington, D. C., 85 per cent., Schenectady, N. Y., 87 per cent., Cincinnati, O., 66 per cent., Binghamton, N. Y., 74 per cent., and Port Huron, Mich., 75 per cent., thus showing that the percentage of Syracuse was under Rochester, Washington and Cincinnati, all large cities and it was also shown by the experts for the company that the existing lines lay all in the east and west streets practically, but few of the north and south streets were piped and those by large feed lines, that the 40 miles of distribution was in a nest of streets by themselves, aggregating 40 miles, while the whole length of streets of the city was some 122 miles and that it was entirely practical in rebuilding and extending the work to reinforce by large lines on the north and south streets and streets where no pipe has yet been laid and by connecting up the smaller pipe to reinforce so that it would represent only short lines between large cross lines and in this way be as serviceable as to take up and relay with larger mains in the east and west streets already laid.

The real estate of the company was valued by the company appraisers at \$156,325, while the city appraisers put the value at \$48,144. Both estimates were made on the theory of an abandonment of the reservoirs and a restitution of the land to uses for building purposes, hence largely speculative.

The result of the trial was that the Commissioners brought in an award of \$850,000 with an addition of \$5,498.03, being for water rents accruing during the pendency

of the proceedings, which report was confirmed and award paid.

At this date, 1893, after the city has run the plant about one and one-half years and with few if any extensions, the net revenue is now reported by the official statement of the water commissioners to be \$100,000, thus making profit enough off the old 40 mile plant to put up an elaborate plant from Skaneateles Lake at a cost of \$3,000,000, and pay the interest on the same, being bonded at 3 and $3\frac{1}{2}$ per cent. leaving the new plant no interest account to provide for as the old plant purchased for \$850,000 provides for it all.

I have endeavored to thus condense or brief the line of proof and the results of the Syracuse Water company condemnation and hope my labors may prove some guide as to the line of proof in similar cases.

STEPHEN E. BABCOCK,

Civil and Hydraulic Engineer,

LITTLE FALLS, N. Y.

